

Patent Application of

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For

TITLE: ACCORDION-LIKE COMPACT DISC CARRYING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is entitled to the benefit of Provisional Patent Application “Portable Compact Disc Storage System”, Ser.# 60/397,731, filed 2002 July 22.

BACKGROUND-FIELD OF INVENTION

The present invention relates to portable disc media carrying systems, specifically to such systems that have accordion-like structure.

BACKGROUND-DESCRIPTION OF PRIOR ART

Disc shaped digital medias, such as compact disc (CD), digital video disc (DVD) and laser disc (LD) have been in great use. The increase in the use of portable CD players, car

stereos and laptop computers have made a huge demand for transporting many of these flat, circular media discs at the same time, in a portable and protective manner. Carrying many compact discs in individual plastic cases is very inconvenient.

Various attempts were made to solve these problems. A typical example of such is seen in "Sleeve type CD Case". The invention is comprised of an outer shell and a plurality of individual compact disc sleeve pockets, mounted inside the outer shell. The sleeve pocket has a flat, double-sided envelope structure. It has openings on both sides to accommodate compact discs in each side, and a media protective sheet is inserted in the middle. A plurality of sleeve pockets are organized and assembled in a book-like fashion.

A compact disc is inserted through an opening of a sleeve pocket. The user must keep the opening of pocket, open by utilizing one of his hands, and insert the compact disc with the other hand. Then, in order to locate the compact disc the user is looking for, the user must flip sleeve pockets one by one to identify the location of objective compact disc among all others. For retrieval, the user holds the sleeve pocket with one hand to stabilize it in place and takes out the compact disc with the other hand. The same, but reverse process is required for insertion. Thus both hands are needed for the storing of compact discs. The invention provides a great method for transporting many discs in a secure, compact manner, however, the following disadvantages are clear to the users:

- (a) The identification of the stored compact discs requires flipping many sleeve pockets one by one.
- (b) The insertion of compact disc is awkward since it requires two hands.
- (c) The retrieval of compact disc is awkward since it requires two hands.

These disadvantages become even more apparent, especially while the user is driving a car; the hands and eyes being busy maneuvering the car and a quick operation of compact disc switching is required.

As an alternative solution to this problem, there exists an expandable file system, or in other words, “accordion file”. “Accordion File” to Cook, Jr, in 1885, shows a typical example of accordion file, which is used to store documents without the awkwardness of the retrieval and insertion from flat file. The invention comprises a series of bellow envelopes, which open and stay in a fan-like fashion. By separating the outer panels at once, the openings of all the pockets are expanded while all the assembled bottom edges of the envelopes are fixed around rotational axes. Through the openings, the documents are inserted, and the contents are relatively easily seen.

“Carrier and Rack for Phonograph Records” to Hills in 1941, 2,261,806 is another example of accordion file used to store phonograph records. The device comprises a series of single flat envelopes assembled in a book-like fashion. When the outer panels are opened, the openings of the pockets expand simultaneously, while the bottom edges of pockets are fixed along the rotational axis of pockets. When a phonograph record is inserted, the upper half portion of it is exposed for the viewing. In open position, the inserted phonograph records are positioned in a fan-like manner, exposing the upper half portions of phonograph records. Thus the device provides a relatively easy solution for the insertion, retrieval and viewing of phonograph records.

“Accordion-like file” to Hunt in 1997, 5,682,992 utilizes a series of single pocket envelopes, having Z-fold structure. A sheet of compact discs protective material is folded in a zigzag manner, creating pockets of single slots on both upper and bottom sides. When the case is opened, the pockets on the corresponding side expand, and stay opened in a fan-like position with the other side of edge fixed along the rotational axis. The case must be supported by the user’s hand for the operation. A compact disc can be inserted

into a pocket, facing either the front or back direction since the entire pocket is made of compact disc protective material. Also, the user may unlock the bottom side of opening and store a compact disc in a pocket therein. Thus compact discs can be inserted through openings of either side, and the stored compact discs are arranged parallel to each other. The invention provides the easy insertion and storage of many compact discs, but there are some disadvantages:

- (a) Upon retrieval, a compact disc the user is looking for may be located in a pocket of the upper or bottom side, thus the user has to look in both sides.
- (b) A compact disc the user is looking for may be facing either the front or back direction, thus, the user has to flip the stored compact discs to see the labels.
- (c) The stored compact discs are viewed vertically and the angle of pocket openings is not wide enough, thus, it is relatively hard to view the contents.
- (d) The entire pockets are made of compact disc protective material, thus manufacturing cost is relatively high.

“Accordion Laser Disc Protective Holder” to Huang, in 2002 is a holder for disc shaped medias such as laser discs and compact discs. The device comprises a plurality of double-sided flat sleeve pockets and accordion folds, where the side edges of the sleeve pockets are engaged with accordion folds, with the bottom edges of sleeve pockets assembled along a rotational axis. Upon unlocking the device, the sleeve pockets are arranged and stay in a fan-like position. For storing, a compact disc is inserted into a sleeve pocket, by holding the sleeve pocket open by one hand and inserting into it by the other hand. For viewing, the compact discs stored in a fan-like position may be looked over through the openings, by tilting the direction of the openings briefly. Huang claims that the invention provides the easy glancing of the contents, however, the following disadvantages exist:

- (a) The device that holds the stored compact discs in a stable fan-like position creates limitations to the viewing contents. For instance, if the device is to hold twenty compact discs and to be opened at 180 degrees, a viewing entrance can have only an 18 degrees angle. This is considered very narrow, and the user must see the labels of the stored compact discs vertically. Because carrying twenty compact discs in one case is very common these days, this is a clear disadvantage.
- (b) The stable fan-like structure of the device does not provide simple one step viewing of the compact discs, since, while two compact discs are seen through one viewing entrance, the compact discs kept on the opposite sides are not seen. Thus the user must tilt the device.
- (c) The device utilizes double sided flat sleeve pockets, which require two hands, thus the problems of the insertion and retrieval are present.
- (d) The use of double sided flat sleeve pockets and accordion files at the same time makes the device relatively thick, less capable of carrying more discs, and more expensive to manufacture.

For these reasons, the invention is less practical in viewing, insertion and retrieval, and manufacture.

Summary

In accordance with the present invention the compact disc storage device comprises a plurality of pockets defined by two identical partitions and two identical side-folds, mounted on a housing defined by a front panel, a back panel, a panel-connecting member and locking members.

Objects and Advantages

Accordingly, several objects and advantages of the present invention are:

- (a) To provide pockets that create two compartment spaces for two compact discs per pocket, saving space and material.
- (b) To provide pockets for compact discs which protect compact disc from scratches and dust while storing.
- (c) To provide pockets for compact discs, where the openings thereof have substantially larger area, easing the viewing of the stored compact discs therethrough and giving an easy access.
- (d) To provide pockets for compact discs where side portions of pockets are made of see-through material, facilitating the viewing of the stored compact discs.
- (e) To provide pockets for compact disc where the openings are substantially larger yet hold the compact discs securely in place in open position, even when the openings are directed toward the center of gravity.
- (f) To provide a series of pockets for compact discs, organizing the stored compact discs for portable purposes.
- (g) To provide a series of pockets for compact discs, which turn to one side automatically, exposing the labels of the contents one by one where the operation requires only one hand, thus facilitating the viewing of stored compact discs.

- (h) To provide a housing for a series of pockets for compact discs, of which outer panels comprising the housing, open automatically after unlocking the device, facilitating the opening of the housing.
- (i) To provide a housing for a series of pockets for compact discs, where the housing has a structural means to stay on various surfaces, providing an environment for storing compact discs.
- (j) To provide compact disc carrying case from which allows the user to insert and retrieve compact discs easily, as well as facilitate the viewing and identification of the stored compact discs.

Further objects and advantages of my invention will become apparent from a consideration of the drawings and ensuing description.

DRAWING FIGURES

In the drawings in accordance with the present invention, closely related figures have the same number but different alphabetic suffixes.

Fig 1 is a perspective view of the invention in open position with compact discs stored.

Fig 2 is a back perspective view of the invention in open position with compact discs inserted.

Fig 3 is a perspective view of the invention in open position with no compact discs stored.

Fig 4 is a perspective view of the invention where the user's hands are operating to turn the pockets to one side.

Fig 5 is a perspective view of the invention where the user's hand is inserting a compact disc into a pocket.

Fig 6 is a perspective view of the invention in closed position.

Fig 7 is a perspective view of a pocket.

Fig 8 is a perspective view of a compartment where the other compartment comprising the same pocket is drawn in phantom lines.

Fig 9 is a front view of a side-fold.

Fig 10 is a front view of a partition.

Reference Numerals in Drawings

20 compact disc storage	30 housing
40 front panel	50 back panel
60 locking member	70 panel connecting member
80 pocket	90 compartment
90a compartment side edge	100 side-fold

100a side-fold centerline	100b side-fold side edge
100c side-fold upper edge	100d side-fold bottom edge
110 partition	110a partition upper edge
110b partition side edge	110c partition bottom edge
120 compact disc	130 user's hand

Description of the Present Invention

Fig 1 illustrates a perspective view of compact disc storage **20** in open position with compact discs **120** inserted. The invention is comprised of a plurality of pockets **80** connected in series, securely and integrally mounted on an outer housing **30**. Pocket **80** is comprised of two identical side-folds **100** and two identical partitions **110**, creating a bellows structure of two compartments **90** as shown in Fig 6. Housing **30** is comprised of front panel **40**, back panel **50** and panel connecting member, where they are serially connected to each other and foldable relative to each other. Locking members **60** are mounted on front panel and back panel respectively, being able to be engaged with each other, locking housing **30** and securing the contents.

Fig 7 illustrates a front view of side-fold **100**. The shape of side-fold **100** is an elongated rectangle where the upper portion is cut as shown, and side-fold is folded in half along side-fold folding line **100a**. The length of side-fold **100**, extending in the horizontal direction has a predetermined distance to bring about "Slinky Effect" among pockets. The term "Slinky Effect" will be discussed in detail in the section "Operation and Function of the Invention". The width of side-fold **100** is shorter in distance than its length. In general the length is about 15.0cm and the width is about 4.0cm, but they are

not limited to these particularities. Side-fold **100** is made of sheet of transparent or translucent material, which includes but is not limited to polyethylene and polypropylene films.

Fig 8 illustrates a front view of partition **110**. The phantom line indicates compact disc **120** when it is stored in face-to-face relationship with partition **110**. The upper portion of partition **110** resembles a portion of a circle, having a circular upper edge, and the lower portion of partition **110** resembles a portion of square. In general, partition **110** measures 13.0cm inches in length, 9.0cm cm in side edge and 9.0 cm in bottom edge. The length of partition **110** is about the same as the diameter of compact disc. Partition **110** is made of a sheet of compact disc protective material, having identical protective surfaces on both sides. The sheet of compact disc protective material includes but is not limited to nonwoven, Tyvex and sheet of silicone coated transparent film.

Fig 6 illustrates a perspective view of pocket **80**. Pocket **80** is comprised of identical, first and second side-folds **100** and identical first and second partitions **110**. A side-fold side edge **100b** of first side-fold **100** is integrally engaged with a partition side edge **110b** of first partition **110**, where the engagement means include but is not limited to heat sealing, gluing and sewing. Side-fold side edge **100b** of said first side-fold **100**, opposing the first engaging edge, is engaged with second partition **110** along a partition side-edge **110b** of second partition **110**. In the same manner, partition side edges **110b** opposing the first engaging edges of first and second partitions **110** are engaged with side-fold side edges **100b** of second side-fold **100** respectively. Along the engaging edges, side-folds **100** and partition **110** are flexibly folded relative to each other. Furthermore, side-folds **100** are folded in half along side-fold centerline **100a**, so that side-folds **100** are sandwiched between engaging partitions **110**. Accordingly, partition bottom edges **100c** of facing, first and second partitions **110** are engaged with each other, and flexibly folded relative to each other. Said first and second partitions **110** and said first and second side-folds **100**, having said structure, comprise pocket **80**. Said pocket **80** has two compartment spaces for compact discs **120** and an expandable opening top. A compact

disc **120** can reside in one of compartments **90** respectively. Compartment **90** is shown in Fig 8, having a circular upper edge.

Fig 1 illustrates a perspective view of a plurality of pockets **80**. A plurality of pockets **80** are serially and integrally connected to each other, in a way that partition side edges **100b** of same partition **100**, comprising first pocket **80**, are further engaged with side-fold side edges **100b** of third and forth side-folds respectively. Accordingly, partition side edges of a third partition **100** are engaged with opposing side edges of third and forth side folds **100**. Furthermore, a partition bottom edge **100b** of third partition **110** is engaged with the bottom edge of first pocket **80**. Thus, said configuration creates a second pocket **80** adjacent to first pocket **80**. Note that the first and second pockets share the same partition **100** utilizing the surfaces on both sides. In this manner, a plurality of pockets are created in a spanning relationship, comprising one integrating body. Said plurality of pockets **80** connected in series are identical to each other and securely mounted on housing **30**.

Fig 1 and Fig 2 illustrates Housing **30**. Housing **30** is comprised of front panel **40**, back panel **50**, and locking member **60**. Front panel **40** and back panel **50** are made of plastic material, having a thickness of about 1.0 mm in general, being hard enough to protect the contents of housing **30**. Front panel **40** and back panel **50** are identical in shape, having elongated half-circles, so that when the body of plurality of pockets are laid down on the inner surface, fit front panel **40** and back panel **50** have enough area to accommodate a plurality of pockets. The bottom edge of front panel **40** is connected to one edge of panel connecting member **70**. The other edge of panel connecting member **70** is further connected to the bottom edge of back panel **50**. The connecting edges of front panel **40** and locking member **70**, back panel **50** and locking member **70** are flexible, and folded relative to each other. Locking member **70** in this preferred embodiment is a zipper. The zipper is engaged along the side edges and upper edges of front panel **40** and back panel **50**.

Fig 5 illustrates the present invention in closed position. The bottom edges of a plurality of pockets **80** assembled along the axis of rotation are engaged with and secured along the centerline of panel connecting member **70**. Said centerline exist to be flexibly folded along, as well as for front panel **40** and back panel **50** to be folded together. The engaging means includes but is not limited to gluing, riveting and sewing. Locking member **60** in the drawing is a zipper. The zipper is engaged along the side and top edges of front panel **40** and back panel **50**, so that when the zipper is closed front panel **40** and back panel **50**, become engaged through zipper. Said embodiments create an enclosed structure for a plurality of pockets **80**.

Alternative Embodiments

There are many possibilities in modifying the device without getting out of the scope of the invention.

Partition **110** may have various shapes other than the one mentioned above. It may be circle, square, rectangle or any combination of these. However, they have one or more of the following functions and structures: partition **110** protects the media surface of compact disc from sliding motion against it, and dusts from the air: partition **110** divides pockets located adjacent to each other: the area of partition **110** is large enough to cover the whole area of compact disc: combined with side-folds, partition **110** secures a compact disc in place.

Accordingly, side-folds **100** may be of a different shape from the one presented above, and one or more of the following functions and structures are observed: thin sheet of flexible transparent material: it can be engaged to the partition **110**. Recall that side folds **100** may or may not have the transparent property, although it is an important feature to ease the viewing of the contents.

There are many methods to secure a series of pockets **80** to housing **30** in addition to gluing to front panel **40** and back panel **50**. A series of pockets may be riveted to panel-connecting member **70**. The outer portions of a plurality of pockets **80** may be engaged with and mounted on the inner surfaces of front panel **40** and back panel **50**.

Locking member **60** may be Velcro, snap-lock or button. Locking member **60** may be anything that has one or more of the following functions and structures: upon locking the device, it holds a plurality of pockets **80** and outer panels together in closed position, securing the stored compact discs in place: upon unlocking the device, it releases a plurality of pockets **80** and outer panels to open.

Operation and Function of the Invention

From closed position as in Fig 4, the device can be unlocked by releasing locking members **60** mounted on side and top edges of front panel **40** and back panel **50**. When the present invention is unlocked, front panel **40** and back panel **50** rotationally move away from each other along the axis of rotation. The axis of rotation is located at the centerline of panel connecting member **70**, which is flexibly folded along while the invention is opened. Meanwhile, pockets **80** expand in such a manner that partitions **110** rotationally move away from each other. As shown in Fig 1, 2 and 3, the present invention is kept open at 180 degrees between front panel **40** and back panel **50** at 180 degrees on a flat surface. Accordingly, in stable open position, three pockets **80** are exposed as shown in Fig1. The angle between partitions is equally divided, having an angle distance of 90 degrees in the stable open position. The present invention may be kept on the user's laps while pocket entrances are exposed to the user for viewing.

As shown in Fig 5, compact disc **120** is inserted into compartment **90** through an opening exposed to the user in stable open position. The openings of compartments **90** are already expanded and large enough, so that compact disc **120** may be inserted by one

hand, not requiring the other hand to hold compartment **90** open. During the insertion, the media side of compact disc **120** directly faces and becomes in touch with partition **110** and the label side is exposed to the opening. As compact disc **120** is inserted, the engaging and folded edges of partition **110** and side-folds **100** hold the disc tighter in place. Since compact disc **120** is circular in shape, the width is shorter at the tip and it becomes its maximum length at the center point. Thus, from the first phase to the last phase, the insertion is continuous and smooth. In the same manner, another compact disc **120** may be inserted into another empty open compartment **90** within the same pocket **80**. In this configuration two stored compact discs **120** are seen together as shown in Fig 1. After all the exposed compartments **90** are filled with compact discs **120**, a series of pockets **80** are flipped to one side automatically by tilting to expose new empty pockets **90**. Thus, all the compartments **90** may be filled with compact discs **120** by one hand operation.

Fig 5 illustrates a perspective view of the present invention where the user's hand is operating the invention for viewing and identifying the contents. The user rests one of the panels on the ground, and tilts the other panel toward the rested panel, where a plurality of pockets **80** are overlaid on the tilted panel. Then, the outer-most pocket **80** facing the rested panel flips toward the rested panel and rests thereon. Consequently, the adjacent pocket flips, being pulled by the weight of the first pocket **80**. The weight of the first pocket **80** is transferred to the second pocket **80** through flexible side-folds **100**. In this manner, all the pockets **80** are flipped to one side automatically. This is what we call "Slinky Effect", like a person is playing by transferring the slinky from one hand to another. Note that a flipping of a pocket takes place independent of another until a partition **110** of first flipped pocket **80** reaches a predetermined point. The predetermined point is determined by the length of side-folds **100**, the turning radius of partition **110**, the weight of partition **110**, the flexibility of side-folds **100** and so on. During this process, all pockets **80** are exposed to the user at an opening angle of 90 degrees, showing the labels of compact discs **120** very clearly. In general, flipping all pockets **90** mounted on housing **30**, takes place in one second. The user may change the speed of flipping by changing the

tilting angle of the tilted panel. The steeper the angle is, the faster it is. If the user finds the objective compact disc **120**, resting the tilted panel on the flat surface stops the flipping.

For retrieval the user may pinch the tip portion of compact disc **120**, or squeeze the tip portion and the center hole of compact disc **120** with fingers. Compact disc **120** may be pulled by one hand since the openings of pockets **90** are wide enough to access by one hand. After the small, compact disc **120** is released from the securing edges of compartment, and slides along the surface of partition **110**. Or compact disc **120** may be lifted off partition **110** and move through the open air inside compartment **90**. Since partition **110** is made of compact disc protective material, the damage to compact disc **120** is minimized upon retrieval.

The present invention may be closed from open position by folding front panel **40** and back panel **50** toward each other. Accordingly, expanded pockets **80** positioned between front panel **40** and back panel **50**, are folded together. In closed position, stored compact discs **120** are sandwiched between partitions **110** and side-folds **100** inside compartments **90**. The pressure from partition **110** and side-folds **120** further secure stored compact discs **120**. Compact discs **120** stored in the device are secured within each pocket **90**. In this manner, stored compact discs **120** stay in place, even when the pocket openings are directed toward the center of gravity. To lock the device, locking member **60** on front panel **40** is to be engaged with locking member **60** on back panel **50**. This procedure completes the operation of locking. Stored compact discs **120** are relatively safer from breaking, tearing, dust and scratches. The device allows the user to carry many compact discs **120** securely in a compact manner.

Advantage

- (a) Compact disc pockets that are comprised of two partitions and two side-folds provide two compartment spaces for compact disc, thus saving space and material.
- (b) Said compact disc pockets in (a) have partitions made of compact disc protective material, thus protecting compact discs from dust and scratches in addition to the benefits of (a).
- (c) Expandable pockets allow a user to insert and retrieve compact discs easily and facilitate the viewing and identification of the stored compact discs.
- (d) Side-folds, comprising pockets have transparent property, easing the viewing of stored compact discs from side direction.
- (e) Compartments have predetermined dimensions and shape to accommodate compact discs, thus holding the compact discs tightly, even if they are put upside down.
- (f) Pockets positioned in a series organize compact discs in a compact manner.
- (g) A series of pockets which have a predetermined distance to allow for “The Slinky Effect”, that is, after one outer-most pocket is flipped to one side, the next consecutive pocket follows, thus having all pockets turn to the side automatically.
- (h) The front and back panels of housing are connected by the flexible panel-connecting member, thus the housing as well as pockets open automatically after unlocking the device, facilitating the opening of the device.

- (i) A housing made of the front panel and back panel connected by the flexible panel connecting member, can stay on various surfaces including flat surfaces and the user's lap.
- (j) The compact disc carrying case with benefits in (a) ~ (i), facilitate the viewing, retrieval and insertion of compact discs. Also, the device allows the user to carry many compact discs in a portable and compact manner.
- (k) The "Slinky Effect" makes it enjoyable to use by a user.

Conclusion, Ramification, and Scope

Thus the reader will see that the portable CD case of the invention provides a device that eases the viewing of the stored compact discs by having expandable pockets, and transparent side-folds and by creating the "Slinky Effect". This eases the insertion and retrieval of compact discs by having expandable pockets that protect the stored compact discs from dust and scratches by having a compact disc protective partition. This also protects the stored compact discs from falling by having pocket structure of the invention described.

While my above description contains many specifications, these should not be construed as limitations on the scope of the invention, but rather as an exemplification of one preferred embodiment thereof. Many other variations are possible.

Accordingly, the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the examples given.